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04G101-4

Rules of Ichnographic R.C. Structure Construction and Detail Drawing

(Cast-in-place R.C. floor plate and roof sheathing, applicable to such major structures as concrete structure and masonry structure)

China Institute of Building Standard Design & Research

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General Introductions

1. This concrete structural drawing collection is one of the G101 series of the National Building Standard Design Drawing (hereafter as NSD) Collection using ichnographic construction drawings (hereafter as Ich-CD).

2. The G 101 series of "Rules of Ichnographic R.C. Structure Construction and Detail Drawing" include the following drawing collections:

03G101-1(cast-in-site R.C. structures: frame, shear wall, frame-shear wall, frame-support shear wall);

03G101-2(cast-in-place concrete slab stairs);

04101-3(raft foundation);

04G101-4(cast-in-place R.C. floor plate and roof sheathing)

3. This drawing collection (04G101-4) is applicable to the design and construction of cast-in-place R.C. floor plate and roof sheathing. The major structures of supporting floor and roof sheathing may refer to cast-in-place concrete frames, shear walls, frame-shear walls, frame-support shear walls and masonry structures with I, II, III and IV grade of seismic resistance design in non-seismic area or the area with an intensity of 6~9.

4. This NSD-collection constitutes of two parts: the rules of ich-notations and detail drawings for cast-in-place R.C. floor plate and roof sheathing.

5. Rules of ich-notations in this NSD-collection are not only for the bases to prepare the ich-CD of cast-in-place R.C. floor plate and roof sheathing by designer, but also for the bases to understand and implement the ich-CD of cast-in-place R.C. floor plate and roof sheathing correctly by constructors and supervisors.

6. Standard construction details in this NSD-collection are included in all current common and mature construction method. The constructors and supervisors must use it as part of formal design document together with corresponding ich-CD.

7. Standard construction details in this NSD-collection are designed based on the following codes:

(1) "Code for Design of Concrete Structures" (GB 50010-2002);

(2) "Code for Seismic Design of Buildings" (GB 50011-2001);

(3) "Technical Specification for Concrete Structures of Tall Building" (JGJ 3-2002);

(4) "Standard for Structural Drawings" (GB/T 50105-2001);

(5) "Technical Specification for Welding of Steel Structure of Building" (JGJ 81-2002).

8. Construction drawing rules, construction details not included in this USD and all other issues shall be provided by the designer of specific buildings.

9. The "Modification Form for Standard Construction Details" is provided in this NSD to meet the requirements of making certain changes of standard details in specific engineering. This form could be used as a reference for preparing structure design specifications.

10. Unit for this NSD, sizes in millimeter (mm) and elevation in meter (m).

11. If there are any problems, comments or recommendations in the use of this NSD, please contact with chief editorial institute and chief editor through http://www.chinabuilding.com.cn.

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Chapter 1 General Principle

1.0.1 The purpose of this NCD-collection is to ensure realizing the uniformity and quality of Ichnographic Construction Drawings (Ich-CD) in the whole country by specifying ich-notations for Building Structural Construction Drawings.

1.0.2 When applying rules of ich-notations in this NCD-collection, not only should it fulfill the requirements in this NSD-collection, but also should it comply with relevant current national technical codes, regulations and standards.

1.0.3 This NSD-collection may be used in conjunction with the NSD 03G101-1 and 03G101-2 or used alone.

Chapter 2 Rules of Ichnographic Beam Floor Slab Construction Drawing

The beam floor slab refers to the floor plate and roof sheathing with beam as support. The rules of ichnographic beam floor slab construction drawing is likewise applicable to the design of beam-slab transfer storey, shear wall structure, masonry structure and floor plate and roof sheathing of basement with beam.

Part I Ich-notations for Ichnographic Beam Floor Slab Construction Drawing

2.1.1 Ich-notations for ichnographic beam floor slab construction drawing refer to notations for plane on the layout drawing of floor plate and roof sheathing.

2.1.2 The notations for plane of slab mainly include:

1. Concentrated marking of slab block;
2. Original place marking of slab support.

2.1.3 To facilitate the design expression and construction drawing recognition, the coordinate directions of structural plane are specified as follows:

1. Where the two-direction axis grid is arranged orthogonally, the X direction will be from left to right while the Y direction from down to up;
2. Where the axis grid turns, the turning angle in the local coordinate direction along the axis grid shall do so correspondingly;
3. Where the axis grid is arranged centripetally, the X direction shall be in the tangential direction while the Y direction in the radial direction.

Moreover, as the area with comparison plane layout (such as turning and bordering area of axis grid and core zone of centripetal arrangement), its plane coordinate direction shall be specified separately by designer and clearly indicated on the drawings.

Part II Concentrated Marking of Slab Block

2.2.1 The concentrated marking of slab block covers the following contents: slab block

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number, slab thickness, penetration longitudinal bar and the elevation difference where the slab surface has different elevations.

As for ordinary floors, one span shall be regarded as one slab block in both directions; as for ribbed floors, one span shall be regarded as one slab block for the main beam (frame beam) in both directions (excluding non-main beam of ribbed floors)Number shall be given to all slab blocks; one of the slab block with the same number may be selected for concentrated marking; as for the rest, it shall only note the slab numbers inside the circle as well as the elevation difference where the elevation of slab surface differs.

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The number of slab block shall be in accordance with those specified in Table 2.2.1.

Table 2.2.1 Number of Slab Block

Slab types	Code number	Serial number
Floor plate	LB	XX
Roof sheathing	WB	XX
Extension cantilever slab	YXB	XX
Simple cantilever slab	XB	XX

Note: The upper stressed steel bar of the extension cantilever slab shall be interconnected with the upper longitudinal bar of adjacent in-span slab for location.

The slab thickness is noted as h=XXX (the thickness perpendicular to the slab surface); where section thickness is changed at the end of the cantilever slab, the height values separated with oblique stroke for at the root and the end shall be noted as h=XXX /XXX; where the slab thickness is noted uniformly in the notes of figures, this item may not be noted.

The penetration longitudinal bar shall be noted respectively according to the lower part and upper part of slab block (where the upper part of slab block is set up with no penetration longitudinal bar, it shall not be noted), with B for the lower part, T the upper part and B&T the lower part and the upper part; the penetration longitudinal bar in X direction shall begin with Y while the two-direction penetration longitudinal bar located identically shall begin with X&Y. As for one-way slab, the distributing bar penetrated in other direction may not be noted, but shall be uniformly noted in the figures. Where constructional bar is located inside certain slab (for example, the lower part of extension cantilever slab YXB or simple cantilever slab XB), the X direction shall begin with Xc while the Y direction shall begin with Yc. Where radial reinforcement is adopted in the Y direction (The X direction is in the tangential direction while the Y direction is in the radial direction), the designer shall indicate the measurement position of reinforcement spacing, Where the cantilever part is different from the in-span slab in height and is lower than the in-span slab, the cantilever part shall be designed as simple cantilever slab XB.

The elevation difference of slab surface refers to the height difference corresponding to the structure floor level, which shall be noted in the brackets; and it shall be noted where there is height difference and not there is no height difference.

Example 1 Provided a floor plate is noted as LB5 h=110

B: Xφ12@120; Yφ10@110

It refers to No.5 floor plate, with a slab thickness of 110mm. The X direction of penetration longitudinal bar located at the lower part of the slab is φ12@120 while the Y direction is φ10@110; no penetration longitudinal bar is located at the upper part of slab.

Example 2 Provided an extension cantilever slab is noted as YXB2 h=150/100

B: Xc&Ycφ8@200

It refers to No. 2 extension cantilever slab with a slab thickness of 150mm at the root and 100mm at the end. Both directions of the constructional bar located at the lower part of the slab is φ8@200. (The upper stressed steel bar is detailed in the original place marking of slab support).

2.2.2 The slab block with the same number shall have the same type, slab thickness and penetration longitudinal bar, but may have different slab surface elevation, span, planeform as well as the upper non-penetration longitudinal bar of slab support. For example, the planeform of slab block with the same number may be in rectangle, polygon and other shape.

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As for the construction budget, the consumption of concrete and steels for slab blocks shall be calculated respectively according to the actual planeform.

2.2.3 During design and construction, it shall notice that the upper equidirectional penetration longitudinal bar of intermediate support for single-direction or two-direction continuous slab shall not be connected at the support position or be anchored respectively. Where the upper penetration longitudinal bar of slabs on two adjacent spans is located identically and there is enough spacing for connection at the mid-span position,

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It may be connected at the mid-span connecting part of either span; where the upper penetration longitudinal bar of slabs on two adjacent spans is located differently, it shall be connected by extending the ending point or starting point of marked span quantities crossed by larger location to the mid-span connection area of adjacent spans.

During design, it shall pay attention that the upper penetration longitudinal bars on both sides of slab intermediate support shall be located coordinately; the construction and budget shall be carried out according to the detailed design and the construction requirements of corresponding standards. The connection construction requirements for upper penetration longitudinal bars of equal-span and unequal-span slab are detailed in Page 25 and 26; where special requirements are desired by specific engineering for the upper longitudinal bar connection of slabs, the connection parts and modes shall be indicated by the designer.

Part III Original Place Marking of Slab Support

2.3.1 The original place marking of slab support covers the following contents: upper non-penetration longitudinal bar of slab support and upper stressed steel bar of simple cantilever slab.

The steel bar for original place marking of slab support shall be expressed by the first span of spans with the same location (Where it is located independently at the beam cantilever position, it shall be expressed at the original place).At the first span (or beam cantilever position) of spans with the same locations, while a segment of medium-heavy solid line with proper length shall be drawn perpendicular to the slab support (beam or wall) (Where the full length of the bar is set up on the cantilever slab or the upper part of short span slab, a segment of solid line shall be drawn to the opposite side or the short penetration span), this line segment shall represent the upper non-penetration longitudinal bar of support; at the upper part of this line segment shall be noted with the number of steel bar (such as ①, ②(2) and etc.), the reinforcement value, the span quantity in transverse continuous arrangement (it shall be noted inside the brackets and it may not be noted where there is only one span) as well as whether to arrange transversely until the cantilever end of beam. For instance, (XX) refers to the quantity of spans in transverse arrangement, (XXA) the quantity of spans in transverse arrangement as well as the cantilever position at one end and (XXB) the quantity of spans in transverse arrangement as well as the cantilever position at both ends.

As for the upper non-penetration bar of slab support, its extension length from center line of support inward the span shall be noted below the line segment.

Where the upper non-penetration longitudinal bar of intermediate support extend symmetrically toward both sides of support, the extension length may only be marked below the line segment at one side of support. See Figure 2.3.1a.

Where the upper non-penetration longitudinal bar of intermediate support extend asymmetrically toward both sides of support, the extension length shall be marked below the line segment on both sides of support (See Figure 2.3.1b).

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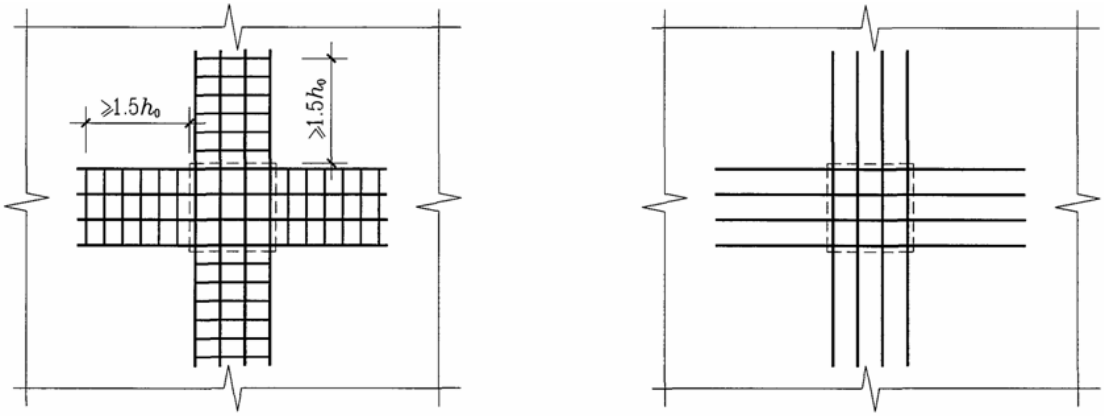

Construction of Anti-punching Stirrup (Rh) Construction of Anti-punching Bent-up Bar (Rb)									Drawing collection number	04G101-4
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